

Application Serial No.: 09/709,935  
Attorney Docket No. 032028-0311103

This listing of claims will replace all prior versions and listings of claims in the Application.

**LISTING OF CLAIMS:**

Claims 1-17. **Cancelled**

Claims 18-28. **Cancelled**

29. (New) A method for determining the concentration of NO<sub>x</sub> in an exhaust plume of a vehicle passing through a beam of radiation projected along an optical path between a radiation source having an initial intensity, and a detector for measuring intensities of radiation incident upon the detector over a range of wavelengths, the method comprising:
- measuring, under ambient conditions, intensities of radiation over a range of wavelengths to determine ambient NO<sub>x</sub> concentration, wherein the range of wavelengths includes at least one absorption wavelength for NO<sub>x</sub>;
  - measuring intensities of radiation, over the range of wavelengths, while the beam of radiation is passing through an exhaust plume of a vehicle after the vehicle passes through the optical path;
  - determining a baseline intensity by interpolating a substantially linear region over an absorption dip in an absorption curve generated from the intensities measured while the beam of radiation is passing through the exhaust plume of the vehicle;
  - calculating the concentration of NO<sub>x</sub> in the exhaust plume of the vehicle, wherein calculating the concentration of NO<sub>x</sub> includes using the baseline intensity to compensate for changes in the initial intensity; and
  - subtracting the ambient NO<sub>x</sub> concentration from the concentration of NO<sub>x</sub> in the exhaust plume of the vehicle.

Application Serial No.: 09/709,935  
Attorney Docket No. 032028-0311103

30. (New) The method of claim 29, wherein the measuring of intensities of radiation under ambient conditions occurs at predetermined intervals.
31. (New) The method of claim 29, wherein the measuring of intensities of radiation under ambient conditions is initiated upon an occurrence of a predetermined trigger event.
32. (New) The method of claim 29, further comprising:  
taking a blocked beam reading when the vehicle is in the optical path and blocking the beam of radiation, wherein the blocked beam reading measures baseline current or noise.
33. (New) The method of claim 32, further comprising:  
subtracting the blocked beam reading from the concentration of NO<sub>x</sub> in the exhaust plume.
34. (New) The method of claim 32, wherein the blocked beam reading is taken after the measuring of intensities of radiation under ambient conditions, but before the measuring of intensities of radiation while the beam of radiation is passing through the exhaust plume of the vehicle.
35. (New) The method of claim 32, wherein the measuring of intensities of radiation under ambient conditions occurs prior to taking the blocked beam reading.

Application Serial No.: 09/709,935  
Attorney Docket No. 032028-0311103

36. (New) The method of claim 29, wherein the range of wavelengths is selected to be substantially centered around a characteristic wavelength such that a number of data points for which there is no significant  $\text{NO}_x$  absorption is minimized.

37. (New) A system for determining the concentration of  $\text{NO}_x$  in an exhaust plume of a vehicle passing through a beam of radiation projected along an optical path between a radiation source having an initial intensity, and a detector for measuring intensities of radiation incident upon the detector over a range of wavelengths, the system comprising:

means for measuring, under ambient conditions, intensities of radiation over a range of wavelengths to determine ambient  $\text{NO}_x$  concentration, wherein the range of wavelengths includes at least one absorption wavelength for  $\text{NO}_x$ ;

means for measuring intensities of radiation, over the range of wavelengths, while the beam of radiation is passing through an exhaust plume of a vehicle after the vehicle passes through the optical path;

means for determining a baseline intensity by interpolating a substantially linear region over an absorption dip in an absorption curve generated from the intensities measured while the beam of radiation is passing through the exhaust plume of the vehicle;

means for calculating the concentration of  $\text{NO}_x$  in the exhaust plume of the vehicle, wherein calculating the concentration of  $\text{NO}_x$  includes using the baseline intensity to compensate for changes in the initial intensity; and

means for subtracting the ambient  $\text{NO}_x$  concentration from the concentration of  $\text{NO}_x$  in the exhaust plume of the vehicle.

Application Serial No.: 09/709,935  
Attorney Docket No. 032028-0311103

38. (New) The system of claim 37, wherein the measuring of intensities of radiation under ambient conditions occurs at predetermined intervals.

39. (New) The system of claim 37, wherein the measuring of intensities of radiation under ambient conditions is initiated upon an occurrence of a predetermined trigger event.

40. (New) The system of claim 37, further comprising:  
means for taking a blocked beam reading when the vehicle is in the optical path and blocking the beam of radiation, wherein the blocked beam reading measures baseline current or noise.

41. (New) The system of claim 40, further comprising:  
means for subtracting the blocked beam reading from the concentration of NO<sub>x</sub> in the exhaust plume.

42. (New) The system of claim 40, wherein the blocked beam reading is taken after the measuring of intensities of radiation under ambient conditions, but before the measuring of intensities of radiation while the beam of radiation is passing through the exhaust plume of the vehicle.

43. (New) The system of claim 40, wherein the measuring of intensities of radiation under ambient conditions occurs prior to taking the blocked beam reading.

**Application Serial No.: 09/709,935**

**Attorney Docket No. 032028-0311103**

44.     *(New)* The system of claim 37, wherein the range of wavelengths is selected to be substantially centered around a characteristic wavelength such that a number of data points for which there is no significant NO<sub>x</sub> absorption is minimized.